

We claim

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1. A 3-heterocyclyl-substituted benzoyl derivative of the formula I

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$$\begin{array}{c|c}
R^1 & N & X \\
R^5 & R^5
\end{array}$$

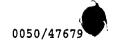
where the variables have the following meanings:

 $R^1, R^2 \quad \text{are hydrogen, nitro, halogen, cyano, } C_1\text{-}C_6\text{-}alkyl,$ $C_1\text{-}C_6\text{-}haloalkyl, } C_1\text{-}C_6\text{-}alkoxy, } C_1\text{-}C_6\text{-}haloalkoxy,}$ $C_1\text{-}C_6\text{-}alkylthio, } C_1\text{-}C_6\text{-}haloalkylthio,}$ $C_1\text{-}C_6\text{-}alkylsulfinyl, } C_1\text{-}C_6\text{-}haloalkylsulfinyl,}$ $C_1\text{-}C_6\text{-}alkylsulfonyl or } C_1\text{-}C_6\text{-}haloalkylsulfonyl;}$

25 R3 is hydrogen, halogen or C_1 - C_6 -alkyl;

are hydrogen, halogen, cyano, nitro, C1-C4-alkyl, R4. R5 $C_1-C_4-alkoxy-C_1-C_4-alkyl$, $di(C_1-C_4-alkoxy)-C_1-C_4-alkoxy)$ alkyl, di(C1-C4-alkyl)-amino-C1-C4-alkyl, 30 $[2,2-di(C_1-C_4-alkyl)-1-hydrazino]-C_1-C_4-alkyl,$ $C_1 - C_6 - alkyliminooxy - C_1 - C_4 - alkyl, C_1 - C_4 - alkoxycarbonyl C_1-C_4$ -alkyl, C_1-C_4 -alkylthio- C_1-C_4 -alkyl, $C_1 \cdot C_4 \cdot \text{haloalkyl}$, $C_1 \cdot C_4 \cdot \text{cyanoalkyl}$, $C_3 \cdot C_8 \cdot \text{cycloalkyl}$, $C_1 \cdot C_4$ -alkoxy, $C_1 \cdot C_4$ -alkoxy- $C_2 \cdot C_4$ -alkoxy, 35 C_1 - C_4 -haloalkoxy, hydroxyl, C_1 - C_4 -alkylcarbonyloxy, C_1-C_4 -alkylthio, C_1-C_4 -haloalkylthio, $di(C_1-C_4-alkyl)$ amino, COR^6 , phenyl or benzyl, it being possible for the two last-mentioned substituents to be fully or partially halogenated 40 and/or to have attached to them one to three of the following groups: nitro, cyano, C1-C4-alkyl, C1-C4-haloalkyl,

 C_1-C_4 -alkoxy or C_1-C_4 -haloalkoxy;



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 R^4 and R^5 together form a $C_2 \cdot C_6 \cdot$ alkanediyl chain which can be mono- to tetrasubstituted by $C_1 \cdot C_4 \cdot$ alkyl and/or which can be interrupted by oxygen or by a nitrogen which is unsubstituted or substituted by $C_1 \cdot C_4 \cdot$ alkyl; or

10 \mathbb{R}^4 and \mathbb{R}^5 together with the corresponding carbon form a carbonyl or thiocarbonyl group;

r6 is hydrogen, $C_1 \cdot C_4$ -alkyl, $C_1 \cdot C_4$ -haloalkyl, $C_1 \cdot C_4 \cdot alkoxy, C_1 \cdot C_4 \cdot alkoxy \cdot C_2 \cdot C_4 \cdot alkoxy,$ $C_1 \cdot C_4 \cdot haloalkoxy, C_3 \cdot C_6 \cdot alkenyloxy, C_3 \cdot C_6 \cdot alkynyloxy$ or NR^7R^8 ;

 R^7 is hydrogen or $C_1 \cdot C_4 \cdot alkyl$;

20 R^8 is C_1-C_4 -alkyl;

X is O, S, NR^9 , CO or $CR^{10}R^{11}$;

25 Y is O, S, NR^{12} , CO or $CR^{13}R^{14}$;

 R^9 , R^{12} are hydrogen or C_1 - C_4 -alkyl;

or

 R^4 and R^9 or R^4 and R^{10} or R^5 and R^{12} or R^5 and R^{13} together form a C_2 - C_6 -alkanediyl chain which can be mono- to tetrasubstituted by C_1 - C_4 -alkyl and/or interrupted by oxygen or by a nitrogen which is unsubstituted

or substituted by C₁-C₄-alkyl;

 $\ensuremath{\mathsf{R}^{15}}$ is a pyrazole of the formula II which is linked in the 4-position

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II

where

where X and Y are not simultaneously sulfur;

with the exception of

 $\label{lem:condition} $$4 - [2 - chloro - 3 - (4,5 - dihydroisoxazol - 3 - yl) - 4 - methylsulfonyl-benzoyl] - 1 - ethyl - 5 - hydroxy - 1H - pyrazole,$

- 4 · [2 · chloro · 3 · (4,5 · dihydroisoxazol · 3 · yl) · 4 · methylsulfonylbenzoyl] · 1,3 · dimethyl · 5 · hydroxy · 1H · pyrazole,

 4 · [2 · chloro · 3 · (5 · cyano · 4,5 · dihydroisoxazol · 3 · yl) · 4 · methylsulfonylbenzoyl] · 1,3 · dimethyl · 5 · hydroxy · 1H · pyrazole,

 4 · [2 · chloro · 3 · (4,5 · dihydrothiazol · 2 · yl) · 4 · methylsulfonyl-
- benzoyl]-1,3-dimethyl-5-hydroxy-1H-pyrazole and
 4-[2-chloro-3-(thiazoline-4,5-dion-2-yl)-4-methylsulfonylbenzoyl]-1,3-dimethyl-5-hydroxy-1H-pyrazole;

or an agriculturally useful salt thereof.

- 2. A 3-heterocyclyl-substituted benzoyl derivative of the formula I where the variables have the following meanings:

$$\begin{split} & C_1\text{-}C_6\text{-}alkylsulfinyl, \ C_1\text{-}C_6\text{-}haloalkylsulfinyl,} \\ & C_1\text{-}C_6\text{-}alkylsulfonyl \ or \ C_1\text{-}C_6\text{-}haloalkylsulfonyl;} \end{split}$$

5	R ³	is hydrogen, halogen or C ₁ -C ₆ -alkyl;								
10		are hydrogen, halogen, cyano, nitro, $C_1 \cdot C_4 \cdot alkyl$, $C_1 \cdot C_4 \cdot alkoxy \cdot C_1 \cdot C_4 \cdot alkyl$, di $(C_1 \cdot C_4 \cdot alkoxy) \cdot C_1 \cdot C_4 \cdot alkyl$, di $(C_1 \cdot C_4 \cdot alkyl) \cdot amino \cdot C_1 \cdot C_4 \cdot alkyl$, $[2,2-di(C_1 \cdot C_4 \cdot alkyl) -1-hydrazino] \cdot C_1 \cdot C_4 \cdot alkyl$, $C_1 \cdot C_6 \cdot alkyliminooxy \cdot C_1 \cdot C_4 \cdot alkyl$, $C_1 \cdot C_$								
15		C_1 - C_4 -alkoxy, C_1 - C_4 -alkoxy- C_2 - C_4 -alkoxy, C_1 - C_4 -haloalkoxy, C_1 - C_4 -alkylthio, C_1 - C_4 -haloalkylthio, di(C_1 - C_4 -alkyl)amino, COR^6 , phenyl or benzyl, it being possible for the two last-mentioned substituents to be fully or partially								
20	halogenated and/or to have attached to them one to three of the following groups: nitro, cyano, C ₁ -C ₄ -alkyl, C ₁ -C ₄ -haloalkyl, C ₁ -C ₄ -alkoxy or C ₁ -C ₄ -haloalkoxy;									
25	or R ⁴ and R ⁵	together form a C ₂ -C ₆ -alkanediyl chain which can be mono- to tetrasubstituted by C ₁ -C ₄ -alkyl and/or which can be interrupted by oxygen or by a								
30		nitrogen which is unsubstituted or substituted by C_1-C_4 -alkyl;								
	or									
35	R4 and R	together with the corresponding carbon form a carbonyl or thiocarbonyl group;								
40	R ⁶	is C_1 - C_4 -alkyl, C_1 - C_4 -haloalkyl, C_1 - C_4 -alkoxy, C_1 - C_4 -alkoxy- C_2 - C_4 -alkoxy, C_1 - C_4 -haloalkoxy, C_3 - C_6 -alkenyloxy, C_3 - C_6 -alkynyloxy or NR^7R^8 ;								
	R ⁷	is hydrogen or C ₁ ·C ₄ ·alkyl;								
45	R ⁸	is C ₁ -C ₄ -alkyl;								

165 is O, S, NR^9 , CO or $CR^{10}R^{11}$; Х is O. S. NR12, CO or CR13R14; Y 5 R^9 , R^{12} are hydrogen or C1-C4-alkyl; R^{10} , R^{11} , R^{13} , R^{14} are hydrogen, $C_1 \cdot C_4 \cdot alkyl$, $C_1 \cdot C_4 \cdot haloalkyl$, $C_1 - C_4$ -alkoxycarbonyl, $C_1 - C_4$ -haloalkoxycarbonyl or CONR7R8; 10 or \mathbb{R}^4 and \mathbb{R}^9 or \mathbb{R}^4 and \mathbb{R}^{10} or \mathbb{R}^5 and \mathbb{R}^{12} or \mathbb{R}^5 and \mathbb{R}^{13} together 15 form a C2-C6-alkanediyl chain which can be mono- to tetrasubstituted by C1-C4-alkyl and/or interrupted by oxygen or by a nitrogen which is unsubstituted or substituted by C1-C4-alkyl; 20 R15 is a pyrazole of the formula II which is linked in the 4-position 25 ΙΙ **R**16 30 where is C₁-C₆-alkyl; R16 35 is H or SO_2R^{17} ; R¹⁷ is C1-C4-alkyl, C1-C4-haloalkyl, phenyl or phenyl which is partially or fully halogenated and/or has attached to it one 40 to three of the following groups: nitro, cyano, C1-C4-alkyl, C1-C4-haloalkyl, C1-C4-alkoxy or C1-C4-haloalkoxy;

is hydrogen or C1-C6-alkyl;

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R18



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where X and Y are not simultaneously oxygen or sulfur;

with the exception of

- 4 · [2 · chloro · 3 · (4,5 · dihydroisoxazol · 3 · yl) · 4 · methylsulfonyı benzoyl] · 1 · ethyl · 5 · hydroxy · lH · pyrazole,
 - 4 · [2 · chloro · 3 · (4,5 · dihydroisoxazol · 3 · yl) · 4 · methylsulfonyl-benzoyl] · 1,3 · dimethyl · 5 · hydroxy · 1H · pyrazole,
 - 4 [2 chloro 3 (5 cyano 4,5 dihydroisoxazol 3 yl) 4 methyl sulfonylbenzoyl] 1,3 dimethyl 5 hydroxy 1H pyrazole,
- 4-[2-chloro-3-(4,5-dihydrothiazol-2-yl)-4-methylsulfonyl-benzoyl]-1,3-dimethyl-5-hydroxy-1H-pyrazole and
 4-[2-chloro-3-(thiazoline-4,5-dion-2-yl)-4-methylsulfonyl-benzoyl]-1,3-dimethyl-5-hydroxy-1H-pyrazole;
- or an agriculturally useful salt thereof.
 - 3. A 3-heterocyclyl-substituted benzoyl derivative of the formula I as claimed in claim 1 or 2, where R³ is hydrogen.
 - 4. A 3-heterocyclyl-substituted benzoyl derivative of the formula I as claimed in any of claims 1 to 3, where
- $\begin{array}{lll} R^1,R^2 & \text{are nitro, halogen, cyano, } C_1\text{-}C_6\text{-}alkyl, \\ C_1\text{-}C_6\text{-}haloalkyl, } C_1\text{-}C_6\text{-}alkoxy, } C_1\text{-}C_6\text{-}haloalkoxy, \\ C_1\text{-}C_6\text{-}alkylthio, } C_1\text{-}C_6\text{-}haloalkylthio, \\ C_1\text{-}C_6\text{-}alkylsulfinyl, } C_1\text{-}C_6\text{-}haloalkylsulfinyl, \\ C_1\text{-}C_6\text{-}alkylsulfonyl or } C_1\text{-}C_6\text{-}haloalkylsulfonyl. \\ \end{array}$
- 5. A 3-heterocyclyl-substituted benzoyl derivative of the formula I as claimed in any of claims 1 to 4, where Z is SO_2R^{17} .
- 6. A 3-heterocyclyl-substituted benzoyl derivative of the formula I as claimed in any of claims 1 to 4, where Z is hydrogen.
- A 3-heterocyclyl-substituted benzoyl derivative of the formula I as claimed in any of claims 1 to 4 or 6, where X is oxygen and Y is CR¹³R¹⁴.
 - 8. A 3-heterocyclyl-substituted benzoyl derivative of the formula I as claimed in any of claims 1 to 4 or 6 or 7, where

		n 4	
		R ⁴	is halogen, nitro, C ₁ -C ₄ -alkyl,
			C ₁ -C ₄ -alkoxy-C ₁ -C ₄ -alkyl,
			$C_1 \cdot C_4 \cdot alkoxycarbonyl \cdot C_1 \cdot C_4 \cdot alkyl$,
			C_1 - C_4 -alkylthio- C_1 - C_4 -alkyl, C_1 - C_4 -haloalkyl,
5			C_1 - C_4 -cyanoalkyl, C_3 - C_8 -cycloalkyl, C_1 - C_4 -alkoxy,
			C_1 - C_4 -alkoxy- C_2 - C_4 -alkoxy, C_1 - C_4 -haloalkoxy,
			C_1 - C_4 -alkylthio, C_1 - C_4 -haloalkylthio,
			di(C1-C4-alkyl)amino, COR6, phenyl or benzyl, it
			being possible for the two last-mentioned
10			substituents to be partially or fully halogenated
			and/or to have attached to them one to three of
			the following groups:
			nitro, cyano, C ₁ -C ₄ -alkyl, C ₁ -C ₄ -haloalkyl,
			C ₁ -C ₄ -alkoxy or C ₁ -C ₄ -haloalkoxy;
15			of of amond or of of maron-mond,
		E	
		R ⁵	is hydrogen or C ₁ -C ₄ -alkyl;
		or	
20			
20		R^4 and R^5	together form a C ₂ -C ₆ -alkanediyl chain which can be
			mono- to tetrasubstituted by C ₁ -C ₄ -alkyl and/or
			which can be interrupted by oxygen or by a
			nitrogen which is unsubstituted or substituted by
25			C ₁ ·C ₄ ·alkyl;
23			
		or	
		02	
		n5 2 n13	touchton form a C C allegation which are to
30		Ry and Ray	together form a C ₂ -C ₆ -alkanediyl chain which can be
			mono- to tetrasubstituted by C ₁ -C ₄ -alkyl and/or
			which can be interrupted by oxygen or by a
			nitrogen which is unsubstituted or substituted by
			$C_1 \cdot C_4 \cdot alkyl$.
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	9.		cyclyl-substituted benzoyl derivative of the
		formula I	as claimed in any of claims 1 to 4 or 6 to 8, where
		R ⁴	is C_1-C_4 -alkyl, C_1-C_4 -haloalkyl,
40			C ₁ -C ₄ -alkoxycarbonyl or CONR ⁷ R ⁸ ;
		R ⁵	is hydrogen or C ₁ -C ₄ -alkyl;
			are eggen of of ared x
45		or	



R⁴ and R⁵ together form a C₂-C₆-alkanediyl chain which can be mono- to tetrasubstituted by C₁-C₄-alkyl and/or which can be interrupted by oxygen or by a nitrogen which is unsubstituted or substituted by C₁-C₄-alkyl;

or

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R⁵ and R¹³ together form a C_2 - C_6 -alkanediyl chain which can be mono- to tetrasubstituted by C_1 - C_4 -alkyl and/or which can be interrupted by oxygen or by a nitrogen which is unsubstituted or substituted by C_1 - C_4 -alkyl.

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10. A 3-heterocyclyl-substituted benzoyl derivative of the formula I as claimed in any of claims 1 to 4 or 6 or 7, where ${\bf R}^4$ and ${\bf R}^5$ are hydrogen.

- 20 11. A 3-heterocyclyl-substituted benzoyl derivative of the formula I as claimed in any of claims 1 to 4 or 6 or 7 or 10, where R¹⁸ is hydrogen.
- 12.4-[2-Chloro-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole.
 - 13. An agriculturally useful salt of 4-[2-chloro-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonylbenzoyl]-1-methyl-5-hydroxy-1H-pyrazole.

14. A 3-heterocyclyl-substituted benzoyl derivative of the formula I as claimed in any of claims 1 to 4 or 6, where

35 X is S, NR^9 , CO or $CR^{10}R^{11}$;

or

Y is O, S, NR^{12} or CO.

15. A 3-heterocyclyl-substituted benzoyl derivative of the formula I as claimed in any of claims 1 to 4 or 6 or 14, where R^{18} is hydrogen.

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16. A 3-heterocyclyl-substituted benzoyl derivative of the								1e						
formula	I	as	${\tt claimed}$	in	any	of	claims	1	to	4	or	6	or	14,
where														

5	R ⁴	is halogen, cyano, nitro, C_1 - C_4 -alkyl, C_1 - C_4 -alkoxy- C_1 - C_4 -alkyl, C_1 - C_4 -alkoxycarbonyl- C_1 - C_4 -alkyl, C_1 - C_4 -alkylthio- C_1 - C_4 -alkyl, C_1 - C_4 -haloalkyl,
10		$\begin{split} &C_1\text{-}C_4\text{-}\text{cyanoalkyl},\ C_3\text{-}C_8\text{-}\text{cycloalkyl},\ C_1\text{-}C_4\text{-}\text{alkoxy},\\ &C_1\text{-}C_4\text{-}\text{alkoxy}\text{-}C_2\text{-}C_4\text{-}\text{alkoxy},\ C_1\text{-}C_4\text{-}\text{haloalkoxy},\\ &C_1\text{-}C_4\text{-}\text{alkylthio},\ C_1\text{-}C_4\text{-}\text{haloalkylthio},\\ &\text{di}\left(C_1\text{-}C_4\text{-}\text{alkyl}\right)\text{amino},\ \text{COR}^6,\ \text{phenyl}\ \text{or}\ \text{benzyl},\ \text{it} \end{split}$
15		being possible for the two last-mentioned substituents to be partially or fully halogenated and/or to have attached to them one to three of the following groups: nitro, cyano, C_1 - C_4 -alkyl, C_1 - C_4 -haloalkyl, C_1 - C_4 -haloalkoxy;
20	R ⁵	is hydrogen or C ₁ -C ₄ -alkyl;

or

25 R^4 and R^5 together form a $C_2 \cdot C_6$ -alkanediyl chain which can be mono- to tetrasubstituted by $C_1 \cdot C_4$ -alkyl and/or which can be interrupted by oxygen or by a nitrogen which is unsubstituted or substituted by $C_1 \cdot C_4$ -alkyl;

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or

 $R^4 \text{ and } R^9 \quad \text{or } R^4 \text{ and } R^{10} \text{ or } R^5 \text{ and } R^{12} \text{ or } R^5 \text{ and } R^{13} \text{ together}$ form a $C_2\text{-}C_6\text{-alkanediyl}$ chain which can be mono- to tetrasubstituted by $C_1\text{-}C_4\text{-alkyl}$ and/or which can be interrupted by oxygen or by a nitrogen which is unsubstituted or substituted by $C_1\text{-}C_4\text{-alkyl}$;

40 R^{18} is $C_1 - C_6$ -alkyl.

17. A process for the preparation of 3-heterocyclyl-substituted benzoyl derivatives of the formula I as claimed in claim 1, which comprises acylating the pyrazole of the formula II where Z = H, where the variables R^{16} and R^{18} have the meanings given under claim 1,

II (where Z = H)

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with an activated carboxylic acid III α or with a carboxylic acid III β ,

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DOY+BOOM . OHBOU

where the variables R^1 to R^5 , X and Y have the meanings given under claim 1 and L^1 is a nucleophilically displaceable leaving group, subjecting the acylation product to a rearrangement reaction in the presence or absence of a catalyst to give the compounds I (where Z = H) and, if desired, to prepare 3-heterocyclyl-substituted benzoyl derivatives of the formula I where Z = SO_2R^{17} , reacting the product with a compound of the formula V,

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$$L^2 - SO_2 R^{17}$$
 V

35

where R^{17} has the meaning given under claim 1 and L^2 is a nucleophilically displaceable leaving group.

18. A 3-heterocyclyl-substituted benzoic acid derivative of the formula III,

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III

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where R^{19} is hydroxyl or a radical which can be removed by hydrolysis and variables R^1 to R^5 , X and Y have the meanings given under the claims 1 to 16, with the exception of methyl 2-chloro-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-

- benzoate, methyl 2-chloro-3-(4,5-dihydrooxazol-2-yl)4-methylsulfonylbenzoate and methyl
 2,4-dichloro-3-(5-methylcarbonyloxy-4,5-dihydroisoxazol-3-yl)benzoate.
- 19.A 3-heterocyclyl-substituted benzoic acid derivative of the formula III as claimed in claim 18 where the variables R^1 to R^5 , X and Y have the meanings given under claims 2 to 16.
- 25 20. A 3-heterocyclyl-substituted benzoic acid derivative of the formula III as claimed in either of claims 18 or 19, where
 - R^{19} is halogen, hydroxyl or $C_1 C_6$ -alkoxy.
- 30 21. A composition comprising a herbicidally active amount of at least one 3-heterocyclyl-substituted benzoyl derivative of the formula I or of an agriculturally useful salt of I as claimed in any of claims 1 to 16, and auxiliaries conventionally used for the formulation of crop protection products.
 - 22. A process for the preparation of a composition as claimed in claim 21, which comprises mixing a herbicidally active amount of at least one 3-heterocyclyl-substituted benzoyl derivative of the formula I or of an agriculturally useful salt of I as claimed in any of claims 1 to 16 and auxiliaries conventionally used for the formulation of crop protection products.
- 23. A method of controlling undesirable vegetation, which comprises allowing a herbicidally active amount of at least one 3-heterocyclyl-substituted benzoyl derivative of the

formula I or of an agriculturally useful salt of I as claimed in any of claims 1 to 16 to act on plants, their environment and/or on seeds.

5 24. The use of a 3-heterocyclyl-substituted benzoyl derivative of the formula I or an agriculturally useful salt thereof as claimed in any of claims 1 to 16 as herbicide.

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